

Appl. No. 09/964,441  
Attorney Docket No. 3777-0102P  
Amendment filed December 13, 2002

a power amplifier for amplifying an amplitude of a signal to supply the signal as power to said ultrasonic oscillator;

a detector for detecting a state of said ultrasonic oscillator; and

a controller for controlling a frequency of said signal depending on an output detected by the detector,

a switching transistor connected between said power amplifier and said ultrasonic oscillator,

a switch control section connected to said switching transistor,

wherein said switch control section turns off said switching transistor until said phase difference becomes equal to a predetermined value, and turns on said switching transistor after said phase difference becomes equal to said predetermined value, and

wherein said power supplied to said ultrasonic oscillator is set to a range from 1W to 10W.

8. (Twice Amended) An ultrasonic cleaning apparatus which cleans a subject to be cleaned by utilizing oscillation generated by an ultrasonic oscillator, comprising:

a power amplifier for amplifying an amplitude of a signal to supply the signal as power to said ultrasonic oscillator;

a detector for detecting a state of said ultrasonic oscillator; and

a controller for controlling a frequency of said signal depending on an output detected by the detector,

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wherein said power supplied to said ultrasonic oscillator is set to a range from 1W to 10W and a difference between a resonance frequency of said ultrasonic oscillator and an anti-resonance frequency thereof is regulated to 1 kHz or more, and

wherein said ultrasonic oscillator is a Langevin type piezoelectric oscillator, and a resonance frequency thereof is set to a range from 20 kHz to 100 kHz.